




UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,839	10/01/2001	Hsing Chen	MR2723-116	3966
4586	7590	03/01/2004	EXAMINER	
ROSENBERG, KLEIN & LEE 3458 ELLICOTT CENTER DRIVE-SUITE 101 ELLICOTT CITY, MD 21043			DONG, DALEI	
			ART UNIT	PAPER NUMBER
			2875	

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/965,839	Applicant(s) CHEN, HSING	
	Examiner Dalei Dong	Art Unit 2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-13 is/are pending in the application.
- 4a) Of the above claim(s) 10-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/965,839.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Newly submitted claims 10-13 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: The inventions are distinct, each from the other because of the following reasons:

Inventions of Group I and Group II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the product of a light-emitting diode can be manufacturing by a different process such as the process recited by U.S. Patent No. 6,299,498 to Liu. Invention of Group II is classified in a different class and subclass, therefore provides extra burden upon the Examiner and thus restriction is proper. The criterion for establishment of restriction is if it can be shown that the product can be made by an entirely different method as claimed by applicant. Because the method of making and the product of the spark plug are distinct invention as acquired a separate status in the art as shown by their different classification, restriction for examiner purposes as indicated is proper.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 10-13 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Objections

2. Claim 9 is objected to because of the following informalities: claim 9 fails specify the claim that is depended on. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,345,903 to Koike.

Regarding to claims 3-6, Koike discloses in Figures 2 and 3, "the light emitting diode element 15 placed within the reflection frame 21 is a small chip shaped in the form of a substantially cube and has electrodes provided at lower and upper surfaces thereof respectively. The undersurface electrode is bonded and fixed to the cathode electrode 13 placed within the reflection frame 21 with a conductive adhesive 22. On the other hand, the top-surface electrode is electrically connected to the anode electrode 14 by a bonding wire 23. The light emitting diode element 15 employed in the present embodiment is a blue light emitting element comprised of a silicon-carbide system compound semiconductor by may make use of a blue luminescent or light emitting element comprised of a gallium-nitride system compound semiconductor. Since no electrode

exists in the lower surface of the light emitting element, it is necessary to connect both P and N electrodes to the cathode and anode electrodes 13 and 14 by bonding wires 23 respectively" (column 5, lines 22-38).

Koike also discloses in Figures 2 and 3, "a first resin encapsulator 25 for sealing the light emitting diode element 15 is charged into the reflection frame 21. A wavelength-converting material excited by blue luminescence or luminescent light to thereby generate visible light having a long wavelength is mixed into the first resin encapsulator 25. For example, it is capable of transforming the blue luminescence into white and emitting its light. As the wavelength-converting material, may be used a luminescent material comprised of a fluorescent dye, a fluorescent pigment or the like. As the fluorescent dye, may be used, for example, an organic phosphor such as fluorescein, rhodamine or the like. Also as the fluorescent pigment, may be used an inorganic phosphor such as calcium tungstate or the like. Incidentally, a wavelength region to be converted can be adjusted by changing the amount of making of these luminescent materials. It is desirable that the amount of charge of the first resin encapsulator 25 is set to such a position that the upper surface thereof becomes lower than an upper edge 26 of the reflection frame 21 as shown in FIGS. 2 and 3 in the present embodiment. Thus, even when a plurality of the surface-mount type light emitting diodes 11 are placed adjacent to each other, light emitted from one light emitting diode can be blocked by the upper edge 26 of the reflection frame 21 of the other light emitting diode. It is therefore possible to prevent luminescent colors of both the light emitting diodes

from being mixed together. Incidentally, an epoxy transparent resin is normally used as a resin material mixed with these luminescent materials" (column 5, lines 38-67).

Koike further discloses in Figures 2 and 3, "the upper portion of the glass epoxy substrate 12 including the reflection frame 21 is sealed with a second resin encapsulator 27. The second resin encapsulator 27 is also comprised of the epoxy transparent resin as a principal component and is shaped in the same flat form as the glass epoxy substrate 12 with a certain degree of thickness. The second resin encapsulator 27 allows a

wavelength-converted luminescent color to be transmitted through the first resin encapsulator 25 as it is and may also use the epoxy transparent resin singly. However, a diffusing agent such as aluminium oxide, silicon dioxide or the like can be mixed into the epoxy transparent resin to obtain a luminescent color having more uniformity" (column 6, lines 1-13).

Koike further yet discloses in Figures 2 and 3, "a third resin encapsulator 28 is stacked over the second resin encapsulator 27 in layered form. An ultraviolet absorbent such as derivatives salicylate, 2-hydroxybenzophenone derivative or the like is mixed into the third resin encapsulator 28. The ultraviolet absorbent blocks ultraviolet rays incident from outside to thereby lessen the influence of the ultraviolet rays on the first resin encapsulator 25 and control aging of the mixed luminescent material. The third resin encapsulator 28 has the same planar form as the second resin encapsulator 27 but is thinner than the second resin encapsulator 27 in thickness. This is because since the third resin encapsulator 28 aims to prevent the aging of the luminescent material due to the ultraviolet rays, the thin thickness of the third resin encapsulator 28 will suffice even

though it is thin if the third resin encapsulator 28 is capable of effectively blocking the ultraviolet rays, and when the thickness of the third resin encapsulator 28 is excessively thick, a luminous intensity is lowered" (column 6, lines 14-32).

Koike furthermore discloses in Figures 2 and 3, "a semi-spherical condenser lens portion 29 is formed at the central portion of the upper surface of the third resin encapsulator 28 integrally therewith in protruded form. The condenser lens portion 29 is located above the reflection frame 21 and serves as a convex lens for condensing or gathering light emitted from the light emitting diode 15, which is upwardly reflected by the inner peripheral surface of the reflection frame 21. Namely, the light emitted from the light emitting diode 15 is divided into ones which upwardly travel in straight lines as they are and ones which are reflected by the inner peripheral surfaces of the reflection frame 21, and thereafter move in an upward direction. Since, however, any light is wavelength-converted by the first resin encapsulator 25 and gathered by the condenser lens portion 29 after the luminescent color is made uniform by the second resin encapsulator 27, high-intensity white luminescent light or luminescence is obtained. No particular limitations are imposed on the curvature radius, form and reflectivity of the condenser lens portions 29 within a range in which light-gathering is obtained. Incidentally, the third resin encapsulator 28 might not be provided with the condenser lens portion 29" (column 6, lines 33-54).

However, Koike does not disclose an encapsulant molded over the electrode support structure and encasing the LED chip, phosphor layer and light diffusion layer. Koike teaches in Figure 9, "a process for sealing a third resin encapsulator 28. In the

Art Unit: 2875

present sealing process, another mold die 37 is prepared in which semi-spherical concave portions 38 for forming condenser lens portions 29 integrally therewith are formed.

Further, the third resin encapsulator 28 is charged into the concave portions 38. The glass epoxy assembled substrate 31 is faced down and inserted into the cure furnace in a state in which the third encapsulator 28 and the second resin encapsulator 27 are brought into contact with each other, thereby thermosetting the third resin encapsulator 28”

(column 7, lines 55-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the encapsulant mold of Koike for the light-emitting diode of Koike in order to protect the light-emitting diode from external environment and control the aging of the wavelength-converting material and thus avoid a reduction in the brightness of the light emitting diode due to the structure insusceptible to the ultraviolet radiation.

Regarding to claim 7, Koike discloses the claimed invention except for the polymeric material is selected from the group consisting of PMMA, PC, PE and PET. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have chose an old and well known polymeric material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Art Unit: 2875

5. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,345,903 to Koike in view of U.S. Patent No. 6,252,254 to Soules.

Regarding to claims 8 and 9, Koike discloses a white light LED comprising: an electrode support structure; an LED chip mounted to said electrode support structure for emitting light a first wavelength; a phosphor layer overlaying said LED chip, said phosphor layer emitting light of a second wavelength responsive to being impinged by said light of said first wavelength, said emission of said first and second wavelengths being perceived as white light; a light diffusion layer overlaying said phosphor layer to provide a substantially even distribution of said emissions of said first and second wavelengths; and, an encapsulant molded over said electrode support structure and encasing said LED chip, said phosphor layer, and said light diffusion layer.

However, Koike does not disclose the diffusion layer includes TiO_2 . Soules teaches in Figure 3, "the light emitting device 30 may also include a plurality of scattering particles 38 which are embedded in a transmissive material comprising, for example, a glass or a polymer or a silicone material. The scattering particles may comprise Al_2O_3 particles such as CR30 alumina powder available from Baikowski or TiO_2 particles, for example. The particles 38 effectively scatter the coherent light emitted from the laser diode 32, preferably with a negligible amount of absorption. The coupling of the diffuse scattered laser light with the phosphor material is advantageous in reducing optical saturation effects and physical damage of the phosphor material" (column 7, lines 11-22).

Art Unit: 2875

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have add the TiO₂ of Soules into the diffusion layer of the light-emitting diode of Koike in order to effectively scatter the coherent light and reduce optical saturation effects and physical damage of the phosphor material.

Response to Arguments

6. Applicant's arguments with respect to claims 3-9 have been considered but are moot in view of the new ground(s) of rejection.
-

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of a light-emitting diode.

U.S. Patent No. 3,875,456 to Kano.

U.S. Patent No. 5,962,971 to Chen.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than ~~SIX MONTHS~~ from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571)272-2378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Application/Control Number: 09/965,839

Page 11

Art Unit: 2875

D.D.

February 19, 2004



ALAN CARIASO
PRIMARY EXAMINER
